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THESIS

THE IMPACT OF WEB TECHNOLOGY ON CUSTOMER INFORMATION FLOW

by
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March 1998

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Customer and employee surveys indicate that the Naval Postgraduate School's Housing Welcome Center is stymied by an information bottleneck at the junction of its counselors and customers. Incoming classes decry housing for its poor communication and lack of information. Housing counselors, ever aware of customer satisfaction, spend too much time transacting routine information rather than helping families solve unique problems. This study examines how World Wide Web technology can widen the bottleneck of poor communications between counselor and customer so as to facilitate both information transactions and problem solving. To provide an analysis of the effectiveness in meeting housing customer needs, this study gauges housing customer satisfaction and determines those elements that customers believe constitute A Great Housing Office. An employee survey, a counselor focus group and archival research further demonstrate the dichotomy between where effort is expended and where it is needed. Customer communication and information expectations cannot be met under the current system. Analysis of qualitative and quantitative data demonstrate that the NPS Housing Welcome Center can overcome its information bottleneck by exploiting the technological advances of the World Wide Web and becoming a hub of information resources.

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THE IMPACT OF WEB TECHNOLOGY ON CUSTOMER INFORMATION FLOW

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Customer and employee surveys indicate that the Naval Postgraduate School's Housing Welcome Center is stymied by an information bottleneck at the junction of its counselors and customers. Incoming classes decry housing for its poor communication and lack of information. Housing counselors, ever aware of customer satisfaction, spend too much time transacting routine information rather than helping families solve unique problems. This study examines how World Wide Web technology can widen the bottleneck of poor communications between counselor and customer so as to facilitate both information transactions and problem solving. To provide an analysis of the effectiveness in meeting housing customer needs, this study gauges housing customer satisfaction and determines those elements that customers believe constitute A Great Housing Office. An employee survey, a counselor focus group and archival research further demonstrate the dichotomy between where effort is expended and where it is needed. Customer communication and information expectations cannot be met under the current system. Analysis of qualitative and quantitative data demonstrate that the NPS Housing Welcome Center can overcome its information bottleneck by exploiting the technological advances of the World Wide Web and becoming a hub of information resources.

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I. INTRODUCTION

A. BACKGROUND

The Naval Support Activity Monterey Bay's (NSAMB's) Housing Welcome Center assigns and manages approximately 844 housing units in the Monterey area for military families. The residences are located at the La Mesa housing complex and the Presidio of Monterey Annex (POMA). The housing office serves NPS student body, its military staff and personnel assigned to the Army's Defense Language Institute (DLI), located five minutes away in downtown Monterey.

A few issues characterize the NPS Housing Welcome Center. First, 287 units in the La Mesa complex will be demolished in 1998 with no scheduled replacements. Their combined plots will be turned into recreation fields and will provide the future site of a Navy Inn (that houses families temporarily).

Second, because the school operates on a year-round basis, a portion of the NPS tenants rotate every three months. This creates four peak periods and the number of incoming students can vary greatly. The class entering in September 1997 had only 58 new students while July 1997 saw over 300 entering students and their families. The NPS admissions office attempts to help Housing anticipate the number of incoming families by publishing the expected number of students for the next class. Not all incoming students have dependents and not all of those with dependents desire military housing. This information does, however, give the housing office some sense of how many units they will need to prepare for the next quarter.

B. THESIS GOALS

To study this problem, I gathered information through customer and employee surveys that would baseline customer service. Archival research into housing office

records allowed me to calculate the monthly wait times for government housing over a one year period. A counselor focus group rounded out the data gathering by reviewing the arrival process and identifying their major concerns.

The NPS Housing Welcome Center is stymied by an information bottleneck at the junction of its counselors and incoming families. While incoming classes decry housing for its poor communication and lack of information, housing counselors toil to greet the next customer and answer the next phone call. This dichotomy illustrates the primary issue: the housing office needs to communicate information more effectively.

The NPS Housing Welcome Center can overcome its information bottleneck by exploiting the technological advances of the World Wide Web and becoming a hub of information resources. The bottleneck of poor communications between counselors and new residents can be widened to facilitate both routine information transactions and problem solving. Recommended changes include designing a web site in incremental steps with both customer and counselor participation.

C. RESEARCH QUESTIONS

The primary thesis question is: How can the NPS Housing Welcome Center improve its effectiveness and customer satisfaction? Secondary thesis questions include:

1) How do customers rate their experience with the NPS Housing Office?
2) Does the NPS Housing Office exceed or fall short of customer expectations?
3) How many days do customers typically wait before given keys to their on-base house?
4) What are the information and communication preferences of the customers?

5) Do customers have access to the Internet before they arrive at NPS?

6) How many times does it take for a customer to resolve one issue with Housing?

7) How do customers rate the quality of information they received before arriving to NPS?

8) How do customers prefer looking for their information?

9) What is the customer's expectations of a great Housing Office?

10) What can be learned from the customer's more positive experiences?

11) What can be learned from the customer's more negative experiences?

12) What is the employee assessment of current customer focus?

13) How can the World Wide Web offer an opportunity to increase the effectiveness of the NPS Housing Welcome Center?

II. BACKGROUND

A. THE ARRIVAL PROCESS

When officers receive orders to NPS, their first thought is to obtain housing in the Monterey area. If single, the officer must live out in town. If married, the family has the option of living out in town or on base at either POMA or La Mesa, the Navy's "married student" housing. With the high prices of local apartments and homes, many families opt to live in government quarters.

Written into every set of orders is the referral of all questions to an "assigned" sponsor at the new command. As a matter of courtesy, many naval units automatically send new personnel "Welcome Aboard" packets that include information about the local economy, real estate, attractions and maps of the local area. Between their sponsor and the "Welcome Aboard" packet, incoming students are expected to have all of their questions answered and any problems ironed out before arrival. As a last resort, a call to the Housing Welcome Center itself can clarify any issue or answer any questions.

Within 6 to 8 weeks after receiving orders, the individual curricular offices send each incoming student a brief introduction letter. It reminds the student to coordinate with Housing if government housing is being requested. Upon contacting the housing office, the military member is instructed on what forms are required. An "Application for Assignment to Housing," form 1746, officially requests government housing. A "Dependency Application / Record of Emergency Data" or "Page 2" identifies legal dependents. And finally, a copy of the NPS orders and its "Detachment Orders," or form 3067, provides the funding data to move the service member and the family to Monterey. The member or spouse is instructed to complete these forms and fax them to the Housing Welcome Center. The member is authorized to use the fax machine at their

local housing office. Upon receipt of this fax, the counselors use this information to plan the arrival date, household goods shipment, etc. for the military member.

When students arrive at NPS, their first stop is at the Housing Welcome Center. During this check-in process they receive information on cable TV hook up, household goods shipment, a resident handbook, medical coverage for California, a map of the housing area, etc. They are given keys to inspect two available housing units, their locations and their interiors. Once a unit has been selected, the family is given keys, their Basic Allowance for Quarters (BAQ) is stopped, and they are free to set up a household goods shipment. Students should not need to deal with the housing office again until they graduate.

B. CONNECTING THROUGH THE COUNSELORS

Inside the office, twenty-seven full and part-time employees grapple with the challenges of placing a growing body of military families into a shrinking number of houses. (See Appendix A) A Housing Director and her Deputy plan future projects, ensure funds are being spent properly, and manage the employees in their day to day tasks. A Customer Relations Specialist tracks customer complaints and oversees special projects. Two military liaisons, an administrative assistant and an automatic data processing (ADP) manager ensure that the office equipment functions and maintain an office-wide schedule. The Facilities department deals with scheduling repairs and inspections of government homes prior to families moving-in or moving-out. These employees work closely with the Public Works employees, who conduct minor repairs and respond to emergencies. Architects and engineers plan for renovations, while others handle budgeting and the flow of funds to different projects.

The core of customer service effort is four full-time Management Assistants, otherwise known as counselors. They are the ones who interact with external customers

on a daily basis and present the first impression of the Naval Postgraduate School to arriving families. Their work is largely administrative in content (e.g., filing papers, answering phone calls and filling-in forms), though there are also functions such as residence inspection, interaction with NSAMB's Public Works Office, and question-and-answer time over the phone with customers. Ask any of them and they agree unanimously that customer satisfaction is their top priority. In fact, all employees at the NPS Housing Welcome Center aspire to provide excellent service regardless of their position.

In general, tenants place little demand on the office during their residency. The management of assets begins with a move-out inspection with the departing tenants. This inspection identifies necessary repairs and reports them to the Public Works Office. The Housing Welcome Center also tracks the status of a variety of units by categorizing them into their individual state of readiness. Among these categories are "occupied," "in maintenance cycle," "vacant," or "at contractor." The home is not returned to Housing until it is in a ready-for-occupancy condition.

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III. METHODOLOGY

Data were gathered from student family customers through a survey using five point Likert-type questions, open-ended questions and informal interviews. Data were gathered from Housing employees through a survey using six point Likert-type responses and a small housing counselor focus group. Surveys were used to identify and collect both employees' and customers' opinions. The surveys served as a mechanism to provide data that could be analyzed for quantitative as well as qualitative results. Archival research was used to determine the monthly move-in times (the number of days from check-in to housing assignment) for the Presidio of Monterey Annex and La Mesa communities. It also served as a method of checking Housing's information processes. Each of these methodologies is elaborated below.

A. CONDUCT OF DATA GATHERING

1. Customers

The method of collecting customer service data was opinion research. In order to get a large sample that accurately reflected the sentiment of customers, I received permission from the Commanding Officer, Naval Support Activity Monterey Bay and the Dean of Admissions to conduct a survey of incoming families during the school's "Welcome Aboard" meetings. These are traditionally held on the first Monday night of each quarter. Three surveys were administered to three entering classes between January 1997 and September 1997.

Half an hour before the start of the meetings I placed blank, serialized survey forms on the table next to the official "Welcome Aboard" packets. A large placard in front of them stated "Please return Housing Surveys immediately following the meeting." Before I stood outside to greet families as they arrived and hand them their

surveys, I walked through the auditorium and made sure that students who arrived early received one as well.

2. Employees

I received permission from the Housing Director to conduct a survey of all employees and to facilitate a counselor focus group. The employee survey was conducted on 3 Dec 1996 during a weekly training session. Forms were handed out to each individual employee and collected by me within a week. The counselor focus group was conducted on 16 September 1997 in Ingersoll Hall's Visualization Lab on the NPS campus. The one hour and 25 minute session was recorded on audio tape. For archival data, the Housing Director allowed me to study official Housing Welcome Center logs and customer records.

B. SAMPLE

1. Customers

Two hundred and eighty eight customers responded to the survey. These customers included bachelors and families, both international and domestic. People living off base were also asked to fill out the survey as well as those who were still living in temporary quarters. A distinction was not made between those students who ultimately got into base housing and those who found a residence off-base. All were treated equally as customers of the Housing Welcome Center. Class sizes varied from 58 in September to 331 in July. The percentage of respondents who filled out a survey form varied from 44% in July to 72% in September (see Table III.1).

Housing Customer Survey Results: Class Statistics				
Survey Date:	6 Jan 97	7 July 97	29 Sept 97	Summary
Total Incoming Class Size:	187	331	58	576
Sample Size:	99	147	42	288
Sample Percentage:	53%	44%	72%	50%

Table III.1

2. Employees

Sample size of the employee survey was 20; the total number of employees was 27. Respondents were all government employees. The sample size of the counselor focus group was three. The fourth counselor was on travel. Respondents were all government employees.

C. INSTRUMENTATION

1. Customers

A copy of the customer survey is presented in Appendix B. The majority of the questions on the customer survey were quantitative. The first two lines were fill-in-the-blank type questions: name, rank, previous duty station, etc. Seven quantitative questions were used to gauge customer satisfaction. Two questions asked about communication and information preferences. Four open-ended questions asked customers for their expectations, their positive and negative experiences, and for any changes they would recommend. The word "Confidential" was printed on the survey form in order to invite frank and candid responses.

2. Employees

Employee questions were formed as six point Likert-type statements and the employees were asked to grade these statements on a scale of one through six, one being

"highly disagree" and six being "highly agree." Each survey was serialized. An example of the format of each question is provided below:

①②③④⑤⑥ I know my customers.

Employees filled out a 171 question survey originally developed to study organizational effectiveness (Merritt, 1996). Eight questions relating to communications, information and customer service were selected for this thesis. Confidentiality of personal responses was ensured to each participant before the surveys were handed out in order to invite frank and candid responses.

A focus group with three counselors centered around identifying major issues and reviewing the move-in process. Discussion contrasted the amount of time taken to disseminate routine information compared to the time needed for solving problems. They also described two processes required during a family's check-in. Confidentiality of personal responses was ensured at the beginning of the focus group.

Archival research included a year's worth of official Housing Welcome Center logs and customer records that were pulled from filing cabinets and reviewed for monthly move-in times. These are the routine records that housing counselors create when checking-in a new customer. They identify the house being assigned and the amount of time it takes for a family to move in. Monthly move-in times and the number of houses accepted were extracted for both La Mesa and the Presidio of Monterey Annex. Four hundred and seventy eight housing records were reviewed from the period starting January 1, 1996 through December 31, 1996.

D. ANALYSIS STRATEGY

1. Customers

Customer survey questions had their data collected and analyzed in Microsoft Excel. Frequencies, means, and medians were used as the primary quantitative analysis methods. The results report percentages of respondents to illustrate customer opinion.

Qualitative responses to question thirteen on the customer survey (What do you expect of a great housing office) were first reviewed for what the customers believed to be the major components of a great housing office. These were communications, information and housing issues. The dominant sub-issue within each of the three categories was counted once per survey. The number of times each sub-theme was mentioned were totaled and summarized by sub-category and then by category. Analysis was conducted on the number of times a dominant sub-category or category was mentioned relative to the others. Definitions and examples for each sub-category are in their corresponding results section.

2. Employees

Employee survey data were tabulated and analyzed in Microsoft Excel. Frequencies and medians were the primary analysis methods. The counselor focus group transcript was later reviewed for major themes and for a review of the move-in process.

In order to review monthly differences in housing turn-over and average wait times, the most recent archival data for the previous calendar year was selected. A large number of data points were retrieved to increase validity and reliability. The data were collected and analyzed in Microsoft Excel. Averages and trend analysis were the primary analysis methods. All numbers were treated as populations.

IV. DATA FINDINGS

A. CUSTOMERS

1. Question One: Rating the NPS Housing Office Experience (Table IV.1)

Question one asked the respondents to rate their experience with the NPS housing office. Two hundred and seventy three students responded to Question one. Frequencies of each response are followed by the median for each class in the table below.

Response frequency was predominantly bell-shaped, beginning with 16% at number one, centering on number 3 with 29% and decreasing to 12% at number five. The median fell in the middle at three. On a scale of one to five, the majority of responses fell half-way between "great" and "terrible." With less than 40% of the respondents having a better than moderate experience, the NPS Housing Welcome Center has room to improve its customers' satisfaction.

Housing Customer Survey Results: Question One: Rating the NPS Housing Office Experience				
Entering Class	Jan	Jul	Sep	Summary
Number of respondents to Question 1:	93	142	38	273
% of Respondents who chose: (great) #1:	20%	12%	18%	16%
#2:	20%	21%	16%	20%
#3:	28%	29%	34%	29%
#4:	22%	24%	21%	23%
(terrible) #5:	10%	14%	11%	12%
Median:	3	3	3	3

Table IV.1

2. Question Two: Rating the Customer Expectations of the NPS Housing Office (Table IV.2)

Question two asked the respondents to rate whether the NPS housing office exceeded or fell short of their expectations. Two hundred and sixty seven students responded to Question two. Frequencies of each response are followed by the median for each class in the table below.

Response frequency began with 12% responding "exceeded," centered on number 3 with 27% and decreased to 23% responding "fell short." The median fell in the middle at three. More than two thirds of respondents felt the NPS Housing Welcome Center was mediocre or fell short of their expectations.

Housing Customer Survey Results: Question Two: Rating Customer Expectations of the NPS Housing Office				
Entering Class	Jan	Jul	Sep	Summary
Number of respondents to Question 2	92	137	38	267
% of Respondents who chose: (Exceeded) #1	15%	10%	13%	12%
#2	21%	15%	11%	17%
#3	27%	25%	37%	27%
#4	22%	22%	18%	21%
(Fell Short) #5	16%	28%	21%	23%
Median	3	3	3	3

Table IV.2

3. Question Three: Average Number of Days before Receiving House Keys

a. Average Number of Days Before Getting House Keys (Table IV.3)

Question three asked the respondents for the number of days they stayed in temporary housing while waiting for the keys to their house. Their answers are summarized in the table below. Two hundred and forty five students responded to question three. The incoming class average started at 12.35 days in January, rising 21% to 14.91 days in July, and then up 88% to 28.09 days in September. The overall average wait time was 15.90 days. Their corresponding standard deviations started at 12.75 days in January, rose to 16.92 days in July, and then to 22.5 days in September. The three survey results show a 44% increase in the average number of days before getting house keys between January 1997 to September 1997.

Housing Customer Survey Results: Question Three: Average Number of Days Before Receiving House Keys				
Entering Class:	Jan	Jul	Sep	Summary
Number of respondents to Question 3:	85	125	35	245
Average Number of Days before Getting House Keys:	12.35	14.91	28.09	15.90
Standard Deviation of Average Number of Days:	12.75	16.92	22.50	16.27

Table IV.3

b. Respondents without a House on the First Day of Class (Table IV.4)

One response kept recurring in Question three: "We don't have a house yet." The table below summarizes the results. The classes surveyed are shown in the first row. The number of students who responded to question three is shown in the second row; the total was two hundred and forty five respondents. The corresponding percent of customers who specifically and voluntarily stated that they were without a house is listed in the third row. The January class had 20% of its students without a house on the first day of class, rising to 28% in July and then 40% in September. The overall average was 27%.

Housing Customer Survey Results: Question Three: Percent of Respondents without a House on the First Day of Class				
Entering Class:	Jan	Jul	Sep	Summary
Number of respondents to question 3:	85	125	35	245
% of customers w/o housing on the first day of class:	20%	28%	40%	27%

Table IV.4

4. Question Four: Communications Between Respondents and Housing (Table IV.5)

Question four asked the respondents for the number of times they communicated with the housing office and the number of times the housing office communicated with them. Their answers are summarized in the table below. A total of two hundred and eleven respondents completed this question. The third row represents the number of times the respondent communicated with the housing office; the total was 1,544. This could have been through several means: faxes, voicemail, walking in, or talking to someone on the phone. The fourth row represents the number of times the housing office communicated with the respondent; the total was 195. The fifth row indicates the average number of times respondents from each class communicated with the housing office; the overall average was approximately seven times for each respondent. The sixth row indicates the average number of times the housing office communicated with each respondent; the overall average was approximately one time for each respondent. The seventh row indicates the average number of times a respondent communicated with the housing office for each time the housing office communicated with them. For the three classes, the average respondent had to initiate communications almost eight times more than the housing office initiated communications.

Housing Customer Survey Results: Question Four: Communications Between Respondents and Housing				
Entering Class	Jan	Jul	Sep	Summary
Number of respondents to question 4:	74	121	16	211
Total number of times respondents reported communicating with the housing office:	391	1,010	143	1,544
Total number of times respondents reported the housing office communicated with them:	78	101	16	195
Average number of times respondents reported communicating with the housing office:	5	8	9	7
Average number of times respondents reported the housing office communicated with them:	1	1	1	1
Average number of times a respondent reported communicating with the housing office for each time the housing office communicated with them:	5	1	9	8

Table IV.5

5. Question Five: Internet Access Before and After Arriving at NPS (Table IV.6)

Question five asked the respondents if they had access to the internet or an online service such as America On Line. Answers were given for both before and after arriving at NPS. Their answers are summarized in the table below. Of the total 288 respondents over 3 survey periods, 64% had access to the Internet before arriving at NPS. 42% of all the respondents had access to the internet by the first day of class, or about two thirds the number who had access before arriving at NPS.

Housing Customer Survey Results: Question Five: Internet Access Before and After Arriving at NPS				
Entering Class	Jan	Jul	Sep	Summary
Number of respondents to question 5:	99	147	42	288
% of respondents reporting access before NPS:	48%	76%	57%	64%
% of respondents reporting access by the first day of class:	29%	48%	48%	42%

Table IV.6

6. Question Six: Resolving a Simple Issue with Housing (Table IV.7)

Question six asked respondents how many contacts with the Housing Welcome Center, on average, it took to resolve a simple housing issue. Four choices were provided. Their answers are summarized in the table below. A total of 229 students responded to this question. The third row indicates the percent of respondents who resolved a simple issue with the housing office with one communication (a fax, a phone call, etc.). Overall, 38% of the respondents resolved their simple issue with the housing office with one communication. The highest percentage of respondents, 43%, resolved a simple issue within two to four contacts with the Housing Welcome Center. Seven percent of the respondents needed five or more contacts to resolve a simple issue with the housing office, and 13% never got their simple issue resolved.

Housing Customer Survey Results: Question Six: Resolving a Simple Issue with Housing				
Entering Class	Jan	Jul	Sep	Summary
Number of respondents to Question 6:	75	119	35	229
% of respondents reporting they resolved a simple issue with the housing office in 1 time:	45%	32%	40%	38%
% of respondents reporting they resolved a simple issue with the housing office in 2-4 times:	40%	45%	43%	43%
% of respondents reporting they resolved a simple issue with the housing office in 5 or more times:	4%	8%	6%	7%
% of respondents reporting they never resolved a simple issue with the housing office:	11%	15%	11%	13%

Table IV.7

7. Question Seven: Rating the Quality of Information Received before NPS (Table IV.8)

Question seven asked the respondents to rate the quality of information received prior to arriving at NPS. Two hundred and seventy eight students responded to Question seven. Frequencies of each response are followed by the average and median for each class in the table below.

Response frequency began with 14% at number one, centered on number 3 with 27% and decreased to 20% at number five. The median fell in the middle at three. Forty percent of the respondents felt the quality of information was above average; 33% felt it was below average.

Housing Customer Survey Results: Question Seven: Rating the Quality of Information Received before NPS				
Entering Class:	Jan	Jul	Sep	Summary
Number of respondents to Question 7:	99	142	37	278
% of Respondents who chose: (Adequate) #1:	13%	16%	8%	14%
#2:	28%	23%	35%	26%
#3:	31%	23%	27%	27%
#4:	16%	11%	11%	13%
(Inadequate) #5:	12%	27%	19%	20%
Median:	3	3	3	3

Table IV.8

8. Question Eight: Preferences for Communicating with an Absent Housing Worker (Table IV.9)

Question eight asked for respondents' preference in communicating with an absent housing worker. Their answers are ranked starting with the most frequent answer in the table below. A total of 271 students responded to this question. The third row indicates the percent of respondents preferring voice messages as a means of communicating with an absent worker; overall, 54% of the respondents preferred voice messages. The fourth row indicates the percent of respondents preferring email; 49% of respondents to question eight preferred email. The fifth row indicates the percent of respondents preferring faxes; only seven percent of respondents to question eight preferred faxes.

Housing Customer Survey Results: Question Eight: Preferences for Communicating with an Absent Housing Worker				
Entering Class:	Jan	Jul	Sep	Summary
Number of respondents to Question 8:	94	135	42	271
Percent of respondents preferring voice messages:	62%	57%	29%	54%
Percent of respondents preferring email:	38%	50%	69%	49%
Percent of respondents preferring faxes:	9%	4%	10%	7%

Table IV.9

9. Question Nine: Preferences in Searching for Information (Table IV.10)

Question nine asked respondents for preferences in searching for information. Their answers are ranked starting with the most frequent answer in the table below. A total of 288 students responded to this question. The third row indicates the percent of respondents preferring to look up information using their computer; 47% preferred this method, more than in any other category. The fourth row indicates the percent of respondents preferring to leave a message and having someone call back with the information; 38% preferred this method. The fifth row indicates the percent of respondents preferring to have the information faxed back to them; 13% preferred this method. The sixth row indicates the percent of respondents preferring to find the information in a telephone voice mail system; 11% preferred this method.

Housing Customer Survey Results: Question Nine: Preferences in Searching for Information				
Entering Class	Jan	Jul	Sep	Summary
Number of respondents to Question 9:	99	147	42	288
Percent of respondents preferring to look up information using their computer:	39%	46%	69%	47%
Percent of respondents preferring to leave a message and having someone call back with the information:	47%	35%	21%	38%
Percent of respondents preferring to have the information faxed back to them:	11%	17%	5%	13%
Percent of respondents preferring to find it in a telephone voice mail system:	11%	11%	12%	11%

Table IV.10

10. Question Thirteen: Customer Expectations of a Great Housing Office

Question thirteen asked respondents what they expected of a great housing office. 196 students responded for a 68% response rate. Of all those who submitted a survey, this question was used to identify the qualitative aspects of the customer's assessment of the NPS Housing Welcome Center. The responses to this question were divided into three categories: communications, information and housing issues.

a. Communication Issues (Table IV.11)

Of the three main categories, the communication theme appeared most frequently when respondents described their expectations of a great housing office, showing in 62% of the responses. This theme was broken down into seven sub-categories, ranked from the most frequent response to the least frequent response, in the table below.

Housing Customer Survey Results: Question 13: Summary of Communication Issues				
Issue	**Jan**	**July**	**Sept**	**Totals**
Responses to Question #13	55	115	26	196
coordination / organization	22%	27%	42%	28%
open telephone lines	20%	14%	8%	15%
access to walk-in service	22%	11%	4%	13%
World Wide Web	7%	3%	8%	5%
voice mail	0	2%	0	1%
email	0	0.9%	0	0.05%
fax	2%	0	0	0.05%
Communications Totals	73%	57%	62%	62%

Table IV.11

The second row indicates the percent of respondents who thought coordination and organization was the primary communications component in a great housing office; it was mentioned by 28% of the total number of respondents to this question. This issue dealt with the efficiency and effectiveness of the Housing Welcome Center. Some examples of comments include:

- expecting counselors to give consistent answers to the same question;
- expecting counselors to have access to necessary information; and
- expecting counselors to inform the customer about delays in the move-in process.

A Navy Lieutenant Commander wrote that he expected "A system that actually works for the Housing Office employees. It is readily apparent that the housing office reps do not know when, which, or how many houses are coming open tomorrow, next week, next month."

The third row indicates the percent of respondents who thought open telephone lines were the most expected component of a great housing office; it was mentioned by 15% of the respondents. An example comes from an Army Captain who wrote, "Positively ensure that incoming students can talk to a human being (not a machine) when necessary."

The fourth row indicates the percent of respondents who thought access to quality walk-in service was the most expected component of a great housing office; it was mentioned by 13% of the respondents. One example was cited by a Navy Lieutenant who wrote, "I needed a quick answer to a simple question, but the receptionists were too busy to help me. So I waited over a half hour to speak to a counselor."

The fifth row indicates the percent of respondents who thought the Internet's World Wide Web (WWW) was the most expected component of a great housing office; it was mentioned by five percent of the respondents. An Army Captain provided an example of its use: "Provide up-to-date, detailed and accurate information on the status of housing on the NPS Homepage. Include a detailed description of what the contractors are doing and why housing is tight."

The sixth row indicates the percent of respondents who thought voice mail was the most expected component of a great housing office; it was mentioned by one percent of the respondents. A Navy Lieutenant wrote that "My biggest frustration was not having my answering machine / voice mail available to me. When I left a message with a renter I had to be in my room at the Bachelor Officers' Quarters (BOQ) to catch their return call. Bottom line: individual voice mail boxes available while house-hunting would be wonderful."

The seventh row indicates the percent of respondents who thought email was the most expected component of a great housing office; it was mentioned by less than one percent of the respondents.

The eighth row indicates the percent of respondents who thought faxing was the most expected component of a great housing office; it was mentioned by less than a percent of the respondents.

b. Information Issues

Quality information was the second-most expected component of a great housing office, showing in 59% of the responses to question thirteen. A total of 196 students responded to question thirteen. The information category was broken down into five sub-categories, listed in Table IV.12.

Housing Customer Survey Results: Question 13: Summary of Information Issues				
Issue	**Jan**	**July**	**Sept**	**Totals**
Responses to Question 13	55	115	26	196
Forecasting	25%	33%	21%	31%
Apartment Information	7%	16%	12%	13%
Standardized Housing Policies	13%	4%	4%	7%
Monterey's Living Conditions	11%	3%	4%	6%
Off-Base Housing Information	4%	3%	4%	4%
Information Totals	56%	60%	58%	59%

Table IV.12

The second row indicates the percent of respondents who thought that forecasting was the primary information component in a great housing office; it was mentioned by 31% of the respondents. Forecasting was defined as some type of

advanced information, such as the number of on-base houses that will become available on a certain date. A Navy Lieutenant Commander recommended that "They should be able to look in a database and find out who is leaving and match up houses long before moving in." A Navy Lieutenant added, "The chronic shortage of housing is alarming and the lack of warning about the situation is reprehensible."

The third row indicates the percent of respondents who thought that off-base apartment information was the primary information component in a great housing office; it was mentioned by 13% of the respondents. An Army captain wrote that he expected "the housing office to actually give apartment referrals! I was given a Xerox copy of the ads from the local paper." He added that the housing office "should serve as a clearing house for apartment applications."

The fourth row indicates the percent of respondents who thought policy information was the primary information component in a great housing office; it was mentioned by seven percent of the respondents. Policy information primarily referred to the standardization of rules versus the content of the actual policy. One example illustrates the differences between Army and Navy housing rules. On the Army's Presidio of Monterey Annex, to which the NPS Housing Welcome Center can assign any incoming family, a women carrying her first child needs to be three months pregnant in order to qualify for an "Army house." At the Navy's La Mesa housing community, the same woman must carry her first child three additional months before qualifying for a "Navy house."

Monterey's living conditions came in fourth at six percent, followed by off-base housing purchase issues at four percent. The sub-category of living conditions included the issues of weather, food prices and traffic conditions. The sub-category of off-base housing information included those issues pertinent to buying a house: prices

for different locations and sizes of homes, real estate brokerage contact information, etc. The last row indicates the percent breakdown for each class.

c. Housing Issues

Housing issues were mentioned in 18% of the responses to question thirteen, the lowest of the three main categories (Table IV.13). On-Base Housing Issues had four sub-categories, listed in the table below.

Housing Customer Survey Results:

Question 13: Summary of On-Base Housing Issues

Issue	Jan	July	Sept	Totals
Responses to Question 13	55	115	26	196
Quantity of Housing	2%	16%	15%	12%
Quality of Housing	4%	5%	0	4%
Safety in Housing Community	2%	3%	0	3%
Housing Total	7%	24%	15%	18%

Table IV.13

Quantity of on-base housing was identified as the primary component of a great housing office by 12% of the respondents. The sub-category quantity referred to the number of available housing units.

The quality of on-base housing was identified as the primary component of a great housing office by four percent of the respondents. The quality of on-base housing referred to any issue about an individual housing unit, for instance its size, cleanliness and layout. One Navy Lieutenant wrote that she expected "at least 2,000 square feet in a home; cleanliness and good maintenance should be without question."

The fourth row indicates the percent of respondents who thought that on-base safety was the primary component of a great housing office; it was mentioned by three percent of the respondents. One Navy Lieutenant wrote that he wanted "security of the areas so I may have peace-of-mind when I'm away from home."

11. Summary of Customer Data Research

Although respondents demonstrated that they were marginally unhappy with the NPS Housing Welcome Center, they were not expecting much either. Their responses also illustrated a 44% increase in the average number of days before getting house keys between January 1997 and September 1997. Analysis also showed that there were a significant (and rising) number of families who were without a house on the first day of class. While one-fifth of January's entering class was without a house on the first day of class, the number continued to rise in July (28%) and ended with 40% in September. This demonstrated an ineffectiveness of the Housing Welcome Center to place families in homes before the start of class.

Communications between customers and the Housing Welcome Center showed an eight-to-one ratio in the number of times a customer communicated with housing to the number of times housing communicated with a customer. This demonstrated either that the initial information was not adequate and required multiple additions or refinements, or that the customer simply had to contact the housing office eight times for them to call back once. Another possible explanation is suggested by the number of calls customers reported before resolving a simple issue. The data showed over 80% were able to do so within the first few communications. This raises the point of keeping enough qualified counselors available and the lines of communications open.

Communications preferences showed 64% of the entering classes had access to the internet before arriving at NPS. Only 42% had access by the first day of class. This demonstrates that the majority of entering classes have access to two as-yet unrealized

communication media: the World Wide Web and email. With an average of 27% of incoming classes without a house by the first day of class, (and therefore no access to their household shipments yet either), there was still plenty of interest in tapping the internet's vast potential to help make a family's transition to Monterey smoother.

Although over half of the respondents preferred using voice messages to communicate with absent housing employees, still a large percent (49%) preferred to use email. Very few respondents preferred using fax machines. Although most respondents and employees are used to voice mail as a method of conducting business, the fact that email was so strongly represented in the results but has yet to be used suggests that requests for it will grow with each incoming class.

A majority of respondents preferred using their computer to search for information, versus leaving messages for someone to call back, having the information faxed back to them or finding the information in a telephone voice mail system. The freedom to search for information 24 hours a day and without any external interaction (i.e. someone having to answer a phone or collate the information to fax back) seems to be a benefit of using computers hooked to the internet.

Communication and information issues were respondents' primary component for what they expected from a great housing office. The ability to properly forecast housing availability was the most expected feature of all sub-categories, and it was mentioned almost two and a half times more frequently than the closest information sub-category. Coordination and organization issues topped the communications category, often being mentioned with forecasting and the ability of a housing staff to get customers through the check-in process efficiently. Housing issues were mentioned very infrequently, with some issues like aesthetics never being mentioned. A Navy Lieutenant summed up his thoughts this way: "A great housing office doesn't necessarily give you a great house when you arrive but a great housing office is staffed

by competent professionals who can answer your questions and return your phone calls, listens to your needs and responds."

12. Quantitative Data Findings

a. Archival Research

Archival research was conducted on the Housing Welcome Center's inbound customer records. The data reported show the average number of days customers had to wait before moving into base housing for each month in 1996. A summary of the results are listed in Table IV.14.

1996 NPS Housing Wait Times The Average Number of Days to Move into an On-Base House						
		POM Annex		La Mesa		Both
		Average	# of homes	Average	# of homes	Average	# of homes
1996	Jan	7.31	13	7.00	24	7.11	37
	Feb	4.92	13	6.86	7	5.60	20
	Mar	8.10	10	8.86	14	8.54	24
	Apr	36.00	1	17.35	23	18.13	24
	May	16.14	7	15.60	42	15.67	49
	Jun	16.07	29	10.03	110	11.29	139
	Jul	17.24	21	11.55	44	13.38	65
	Aug	16.13	16	9.07	27	11.70	43
	Sep	5.75	8	10.96	25	9.70	33
	Oct	13.25	4	20.17	12	18.44	16
	Nov	12.14	7	25.40	5	17.67	12
	Dec	11.00	4	8.92	12	9.44	16
Average		13.67	133	12.65	345	13.16	478

Table IV.14

April and October, respectively, had the longest wait times (18 days); February and January, respectively, had the shortest wait times (6-7 days). The average wait time for POM Annex was 13.67 days. The overall average wait time for La Mesa was 12.65 days. The average wait time for both communities was 13.16 days. A total of 478 houses were moved into over the course of 1996.

13. Summary of Archival Data Research

Table IV.14 shows the monthly move-in times and the number of units that were moved-into during 1996. The overall average from the archival data (13 days wait) is

fairly close to the average number of days the customers reported they waited for house keys (16 days). The difference could be attributed to different starting points at which customers and the housing office start to count. The customer might arrive in Monterey on a Saturday night and have to wait for housing to open Monday morning. Housing would not start counting days until it opened for business Monday morning.

Adding to the 13.16 day average were factors that should not be held against the housing office. Some customers selected a residence with the understanding that repairs necessitated a long wait. This kind of mutual agreement skewed the data unfavorably against the Housing Office. Perhaps another family had extenuating circumstances which prevented their move-in even though the house was ready for them. The sole reliance on handwritten entries in cloth-bound logs would not allow detection of such an event, yet their weekly status report reflected a long delay.

14. Personal Impressions

Between interviewing families and reviewing Housing's handwritten logs and customer records, I noticed that many of the prompt assignments were completed by customers who knew how to navigate the challenges of the military housing system; they moved in the quickest. These successful families typically did at least one of three things: 1) they reported early to select housing before going on transfer leave, 2) they used a power-of-attorney to attain early housing assignment, or 3) they used an effective sponsor who personally dealt with the housing counselors. The large number of quick move-ins was achieved by customer prudence rather than an effective management control system established by the Housing Welcome Center.

I noticed there was a wide variation in respondents' ratings of the quality of information received before arriving at NPS (Table IV.8). Still, 33% of the respondents felt that the information was less than adequate. This could be due to the formal (but perhaps inadequate) means of communicating information. Customers complained

about receiving outdated form letters from the housing office (this has since been corrected), lackadaisical contacts in the sponsorship program, or clogged phone lines to a busy counselor. The happier customers seemed to rely on more informal methods to retrieve information, such as contacting friends already stationed at NPS or using the World Wide Web for Monterey's current events and living conditions.

I also observed that customer relations are further strained because the housing office presently has no means of telling a customer the status of their prospective home. This disconnect between Housing and Public Works makes Housing look irresponsible and incompetent in the eyes of the customer. Families stressed that electronic, interactive inter-departmental status reports (between PWO and Housing) on individual units would broaden the Housing Office's knowledge about the readiness of their assets. One initiative to help customers' communication and information needs started in 1997. The office started leaving a paper copy of the customer wait list on the front desk, although this did not help families locked out during weekly training sessions on Tuesday afternoons or trying to call busy phone lines. How much the list helped could be debated; customers I spoke with became infuriated watching their number rise and fall on the list for unknown reasons.

B. EMPLOYEES

1. Employee Survey Results

Twenty of 27 employees responded to the employee survey for a 74% response rate. Eight questions evaluating customer service were formed as six point Likert-type statements and the employees were asked to grade these statements on a scale of one through six, one being "highly disagree" and six being "highly agree." Frequencies of each response are followed by the median for each statement in the table below.

Employee Survey Results: Eight Customer Service Questions: Frequencies and Medians							
Question	#1	#2	#3	#4	#5	#6	Med
1) I know my customers.	0%	0%	6%	6%	33%	55%	6
2) I have a clear understanding of how my customers define quality.	5%	0%	5%	16%	27%	52%	6
3) As part of my work, I seek customer feedback to improve my products and services.	0%	5%	5%	5%	32%	53%	6
4) We listen carefully to what (external) customers say they need.	11%	5%	0%	21%	21%	42%	5
5) We provide (external) customers with options that allow them to make sound financial as well as operational decisions.	12%	12%	6%	23%	12%	35%	4
6) Customer questionnaires, surveys or visits are conducted to determine external customer needs.	21%	0%	6%	26%	21%	26%	4
7) We actively communicate process changes that result in reduced costs, higher quality or better customer service.	25%	20%	15%	15%	5%	20%	3
8) We include external customers and suppliers as team members to solve problems.	41%	11%	16%	5%	11%	16%	2

Table IV.15

a. I know my customers.

The first question had eighteen respondents and received a median of 6. It received the highest score of the eight questions reviewed for this thesis. Seventeen of the eighteen respondents scored the statement in the upper half of the six-point scale, sixteen of them in the top two categories. Only one person scored themselves below the

midpoint. This denotes that the majority of the respondents believed that they knew their customers.

b. I have a clear understanding of how my customers define quality.

The second question had nineteen respondents and received a median of 6. Eighteen of the nineteen respondents scored the statement in the upper half of the six-point scale, fifteen of them in the top two categories. Only one person scored themselves below the midpoint. This denotes that the majority of the respondents believed that they clearly understand the customers' definition of quality.

c. As part of my work, I seek customer feedback to improve my products and services.

The third question had nineteen respondents and received a median of 6. Seventeen of the nineteen respondents scored the statement in the upper half of the six-point scale, sixteen of them in the top two categories. Two employees scored themselves below the midpoint. This denotes that the majority of the respondents believed that they seek customer feedback to improve their performance.

d. We listen carefully to what (external) customers say they need.

The fourth question had nineteen respondents and received a median of 5. Sixteen of the nineteen respondents scored the statement in the upper half of the six-point scale, twelve of them in the top two categories. Three employees scored the Housing Welcome Center below the midpoint. Although this still denotes that the majority of the respondents believed that they listen to customers' needs, the drop in median demonstrates less agreement when compared to the first three questions.

e. We provide (external) customers with options that allow them to make sound financial as well as operational decisions.

The fifth question had seventeen respondents and received a median of 4. Twelve of the seventeen respondents scored the statement in the upper half of the six-

point scale, eight of them in the top two categories. Five employees scored themselves below the midpoint. This demonstrates that while 30% of the respondents believed that they do not provide customers with enough options, 35% strongly believed they do.

f. ***Customer questionnaires, surveys or visits are conducted to determine external customer needs.***

The sixth question had nineteen respondents and received a median of 4. Fourteen of the nineteen respondents scored the statement in the upper half of the six-point scale, nine of them in the top two categories. Five employees scored the Housing Welcome Center below the midpoint. One quarter of the respondents believed they do not actively-enough determine customer needs; the remaining 75% believed they make sufficient effort to do so.

g. ***We actively communicate process changes that result in reduced costs, higher quality or better customer service.***

The seventh question had twenty respondents and received a median of 3. Only 40% of the twenty respondents scored the statement in the upper half of the six-point scale, 20% of them in the top two categories. The majority of the respondents (60%) scored the Housing Welcome Center below the midpoint, denoting that they believe the office does not successfully communicates process changes that ultimately improve customer service.

h. ***We include external customers and suppliers as team members to solve problems.***

The last question had nineteen respondents and received a median of 2. Less than one third of the nineteen respondents scored the statement in the half of the six-point scale, five of them in the top two categories. The majority of the respondents (68%) scored the Housing Welcome Center below the midpoint, denoting that they

believe the office does not successfully include customers and suppliers in solving problems.

2. Employee Focus Group

The purpose of the counselor focus group was two-fold: to identify major issues and to review the move-in process. In pinpointing central themes, the discussion quickly centered around the time required to transact routine information. The counselors reported that 95% of calling customers sought routine information. In searching for temporary lodging, for example, customers preferred not to call the toll-free operator for hotel phone numbers, but instead wanted the counselors' list of local hotels and their descriptions, which ones had better discounts, which ones allowed pets, etc. One counselor even maintains a list of local hotel phone numbers in the front of her notebook because she repeats the numbers so often.

Because the military services do not keep track of family information, it must be updated once a student arrives. Great care and attention is required by both customer and counselor to ensure it is accurately transferred; hence the importance of the check-in meeting. When a naval officer checks-in, for instance, the only information the school is given from the Navy's Bureau of Personnel is the student's social security number, name, rank and the accounting data that will pay for the transfer and subsequent education. The housing office must therefore rely on the student to communicate all other personal information that will affect housing placement (e.g., marital status, number of dependents, number of pets in the family, special medical requirements of dependents, etc.).

This precludes the counselors from placing families into houses before they arrive and requires them to tediously record information during the check-in process. The results of the focus group are given below.

a. Time Spent Transacting Information

The focus group initially dealt with quantifying the time required to transact routine information between the counselor and a new resident. During a typical check-in at the counselor's desk, desires and problems are addressed and the paperwork finalized (more on this in the next section). The counselors said they rarely complete the ten family interviews they typically schedule during a regular business day. Their belief is that during these one-on-one meetings the incessant ringing of phones slows down the check-in process.

Who's calling? Inquiring customers, sometimes up to 35 in a counselor's day, who are planning their move to Monterey. The problems this causes, the counselors said, is decreased attention to the family sitting before them and a consequent decrease in the number of customers they can service in a day. But if these phone calls were helping customers, I countered, how are they any lower priority than the families scheduled for a check-in interview and who happens to be sitting before them?

It was at this point the counselors focused on qualifying the type of phone calls they typically receive. The counselors agreed that the overwhelming majority of the incoming phone calls they get are for transacting routine information as compared to what they achieve with a family going through check-in: solving unique problems. The counselors conceded that they are forced to simply ignore the ringing, let their answering machines take the call and they return the calls at a later time. During the weeks preceding a heavy influx of customers (during the summer, for instance), this does not always work; their answering machines can get overloaded and shut down. Nonetheless, the result is the same: With the housing rules requiring counselors to return phone calls within 24 hours, the counselors are taking time away from servicing more families, training and getting caught up in administrative paperwork.

Answering incoming phone calls was not the only communications method that was dominated by the exchange of routine information (such as reciting housing regulations, listing hotel phone numbers or names of local kennels). Sending faxed forms to customers, receiving them back and transferring the information from printed form into a computer took time and was prone to errors. Mailing and faxing sets of floor plans to those incoming residents who requested them not only took time, the counselors argued, but the postage and long-distance charges further ate away at a dwindling budget, one they would like to see reallocated toward training and improved customer service. When I asked how the counselors find time to even eat lunch, they all shrugged as one of them stated, "We do whatever it takes."

b. Move-In Procedures for the Counselors

The counselors reviewed the procedure they follow to check in a family. A summary of the procedure follows.

(1) The Move-In Packet. Each customer receives a choice of two houses. They are given each house's keys so they can inspect the premises before choosing a unit. Upon returning to their counselor they are given a "Move-In Packet." This contains a quarter's brochure and a Monterey orientation packet. The packet also contains a Housing Offer Sheet, which the customer must sign, thereby formally declaring which of the two offered units they accept.

(2) Signing for Keys. The counselor then sets up a move-in inspection and explains to the future tenant that they are expected to document any damage inside the unit. The counselor then records the tenant's information on the maintenance quarters card that tracks the projected offer date and the date the tenant signed for the house. The keys are then given over to the new tenant.

(3) Processing New Tenant into Computer. The next step requires the counselor to enter information into the computer. This information,

however, is not entered into one file; it must be entered into 12 separate files. For example, in one file, the counselor enters the date the new tenant was assigned their unit. In another file, the counselor types in the new tenant's name, rank and branch of service before erasing the telephone number of the former tenant. In a third file, the counselor puts in the same new tenant's name and rank, but this time adds the type of floor plan assigned and their address.

(4) Processing Paperwork to Stop BAQ/VHA Allowances. The counselor then hand writes on a white card the new tenant's name, rank, social security number, curriculum, the number of dependents and their names, house address, floor plan, date house was assigned (when keys were taken) and the anticipated graduation date in pencil. On the Location / Quarters card, the counselor fills in the rank, name, branch of service, date of assignment to housing and expected graduation date in pencil. The white card is then paper-clipped to the Quarters card and sent to the maintenance department. The counselor will get back the white card for filing.

There are two different forms for stopping allowances. The 3060 form is used for Navy personnel, while another form is used by the remaining branches of service: the Marine Corps, the Army, the Air Force and the Coast Guard. The counselors are warned in their procedures for typing the Navy's form 3060: "Be sure to use the 10 pitch ball in your typewriter, not the regular 12 pitch typing ball used for correspondence." The instructions go on to say "On the 3060 after it is signed by the Housing Manager/Maintenance Director, tear out the middle carbon and staple to the tenant's housing package." Up to seven tenants can be typed onto one form 3060, which can help during the heavily-trafficked months of December, March and June.

This time-intensive process does not add any value to check-in, but only mires it down with exhausting instructions. The counselors remain no more

effective in addressing a family's unique problems during check-in than they are in disseminating routine information over the phone.

3. Summary of Qualitative Employee Data Research

The employee focus group demonstrated three things: first, the tedious process of checking in a family; second, the extraordinary time demands of transacting routine information during the business day; and third, what little time this leaves to address and solve customer problems.

The first four statements of the employee survey indicated that the employees self reported that they were actively involved with their customers and striving to meet customer needs. These garnered the highest scores and most emphasis from the employees. The last four statements referred to the collective housing office's customer service efforts and received the lowest grades. The apparent organizational ineffectiveness to communicate with external customers is perhaps what is preventing otherwise effective employees from delivering their full potential that they rate so highly.

The counselors also pointed out that their house-tracking control system is underutilized for one central reason: it is still being kept in a green Navy log book. Although this serves as a convenient method for looking up an individual record, it does not serve management's need to continually improve Housing's performance. An electronic database system could be tied into the Registrar's and Public Works' home page to more accurately communicate with incoming families and determine exact housing requirements. This system could also enable Housing to track historical trends and anticipate customer requirements.

4. Data Conclusion

The central problem revolves around an organizational bottleneck of information flow. The customers do not seem to get enough information in a timely and convenient

manner. The counselors, ever aware of customer satisfaction, cannot find enough time to transact information and to help families solve problems. The Housing Welcome Center must control its output measures and improve its performance but not at the expense of a frustrated employee pool and outraged customers.

It appears that housing is less a dysfunctional system and more a set of customers who are largely unaware of the challenges inherent in running a military housing office. The expectations of customers cannot be met under the current system. This in turn contributes significantly to the negative feedback. The Housing Welcome Center must change the way it conducts business. The counselors are overworked in providing repetitive information to caller after visitor after caller. The customers need to receive more accurate information in a more timely manner. An improved information distribution network could aid in relieving some stresses in an already under-staffed office.

V. ANALYSIS

A. REVIEW OF THE MAJOR ISSUES

The problem between Housing, the counselors and the customers is an apparent bottleneck of information flow. The corporate housing office assigns its housing units to qualified customers. There are strict rules governing the qualifications as well as the procedure for obtaining a house. The customers often do not see or care about the rules — they simply want an adequate home in which to live. The counselors, however, are caught in the middle by trying to service a continually shifting student body while following the administrative requirements outlined by government regulations. This takes up so much of their time that it ends up restricting the flow of information between Housing and the customer, forming a bottleneck of information flow at the counselor's desk.

Widening this bottleneck will achieve two major accomplishments. First, it will improve the flow of information between Housing and its customers. Second, it will free the counselors to spend more time solving problems and less time dispensing common information. Central to each of these solutions are necessary increases in the quantity of information transacted as well as the quality of communications. More efficient communications will allow more information to be exchanged. Likewise, more adequate information will lessen the necessity to repeatedly communicate common information.

In determining the best method of achieving this two-pronged solution requires a review of the three major problems that equally affect Housing, counselors and customers. They are:

- Counselors are bombarded with phone calls and don't have time to service all the clients. They spend their time answering the same questions the last entering class asked instead of solving customers' unique problems.
- Other administrative tasks, such as entering faxed data into log books, also takes up valuable time and can lead to inaccuracies.
- Students cannot always reach their counselor due to differences in time zones and work schedules.

Determining a solution that can address these issues with a minimal amount of resources is essential in today's tight budget environment.

B. THE BENEFITS OF A WEB-BASED SOLUTION

With the frantic expansion of the Internet since its inception during the mid-1980's, the world has caught a glimpse of how business will be conducted in the Twenty-First century. Internet technology has shifted the focus of software from single purpose, desktop programs to powerful, hybrid ones that retain the depth of a single program yet draw on the services and support of large database, transaction and other traditional enterprise systems. These systems connect customers to suppliers, management to work force and information to anyone who needs it. Internet technology has also become more powerful than any stand-alone application by being more flexible, more modular and more easily updated. In essence, it is fundamentally changing the way we conduct business.

IBM has published seven white papers regarding the Web. It has determined that there are three primary phases of service on the World Wide Web: publishing content, team collaboration and secure and reliable information exchange. Each tier builds upon the previous and is differentiated by the addition of a fundamental service.

Each of these services, and how they could be applied at the NPS Housing Welcome Center, will be explored in the following sections.

1. The First Phase: Publishing Content

The first stage of Web-based business communicates content; it is a one-way transaction, such as publishing a web page. Static information is posted once at a web site's address, and countless numbers of readers with access to the Internet can search for its content, read it and even retain a copy of it. Companies can efficiently manage the content of their business by leveraging information with this "write-once, read many" model. It provides a fast, inexpensive method for a company to post public information. Its quick and free access provides unlimited viewing by anyone with Internet access. Some concepts IBM provides of Web-based content publishing can be applied within the NPS Housing Welcome Center:

- *Applications that disseminate information through publication on a web site—for instance, policies and announcements.*

This quick and easy method of publicly disseminating information allows counselors and their customers to work from a uniform set of regulations and policies. If there is a change, it needs to be updated only once; everyone reading the information afterwards will see change.

An example would be to publish the NPS Housing Regulations on a web page so that counselors could refer to a convenient and uniform set of rules. Likewise, the customers could search for routine information 24 hours a day without bothering a Housing employee or clogging a phone line. Any changes in these rules would be reflected instantly on the web page to both counselors and customers.

- *Applications that establish or extend a company's presence on the Internet—sites that describe product offerings, services, and strategies. Once these sites are established, they can be integrated with other online processes.*

This theme is already addressed in the main NPS web site (www.nps.navy.mil). It contains the school's strategic vision, class schedules and even a telephone directory. The key is integrating this with a Housing Welcome Center Web site that is dedicated to serving incoming NPS students and all of their housing needs.

Being dubbed a Welcome Center instead of just a housing office, the NPS Housing Welcome Center could grow to perform more functions than simply placing families in government homes. As a hub of information resources, its web site may not answer every visitor's question, but more importantly, it could direct them to the right answers. For instance, the web site could have information on Monterey businesses that customers might need, like kennel rates, local real estate listings and a listing of doctors who are sponsored by the military's insurance plan.

- *Applications that manage and access sensitive data: Financial data, customer data, employee data and so forth.*

Instead of exchanging faxed forms, (whose small text and old technology make it prone to errors and just as susceptible to intrusion), privacy data such as name, social security number and date of birth, can be safely transacted over the Internet with today's encryption technology.

The complex process of entering vital family information into the Housing computer system could be performed through a secure web site by the customer. By allowing the customers to transact their own information, they take responsibility for the timely and accurate entering of their sensitive data. This allows the counselor to focus on the data content without getting mired down in the data-entering process.

- *Applications that draw upon increasingly complex multimedia assets, such as photographs, audio and video.*

In addition to providing worldwide, 24-hour-a-day service to any student seeking specific housing rules or announcements, complete floor plans and three-

dimensional interactive pictures of each style of home can be included on the Web site. Diagrams and color pictures, for instance, can show arriving families how to get to La Mesa or what their street looks like.

The NPS Housing Welcome Center web site could show a detailed diagram of the La Mesa housing community, for example. Each house would be color coded, indicating its occupancy status. By clicking on the house, its floor plans, address, picture and the estimated date of availability could be displayed.

2. The Second Phase: Team Collaboration

The second phase of Web-based business brings people together for two-way communication. This allows teams to collaborate on a project and customers to interact with their suppliers. This form of communication blurs traditional boundaries, making physical presence in a building or corporation a convenience and not a necessity. Some concepts IBM provides of Web-based collaboration are followed by possible applications within the NPS Housing Welcome Center:

- *Communication systems, including electronic mail and messaging systems, customer service automation solutions and contact management.*

Automated messaging systems provide a convenient and organized method of exchanging information. Instead of limiting counselors to fielding phone calls (some of which are long distance and expensive) from external customers, questions and responses can be queued and filed within an e-mail application. This allows the customers to write anytime (as opposed to waiting for the housing office to open during business hours) and likewise allows the counselors to respond anytime, even at home or during a break. Copies of incoming and outgoing messages can be instantly filed and retrieved by any counselor and require minimal storage.

- *Human resource solutions, including employee self-service and organizational planning and development.*

This aspect of a collaborative Web site allows all housing employees to access separate data not needed for customer service. This includes looking up their pay records, checking on their retirement benefits, or reviewing the minutes from yesterday's training session. This also empowers management to publish and collect information from the employees without having to formally meet, thereby allowing them to concentrate on their jobs.

- *Intranets and extranets that link internal teams with vendors, suppliers, and partners to share information and streamline processes.*

This allows the exchange of information between departments and with external parties. For instance, if a customer is driving to Monterey and wants to know when their house's renovation will be completed, the counselors can go right to the Facility department or contractor's Web site and find the information.

3. Third Phase: Secure and Reliable Information Exchange

The third phase of Web-based business involves what is commonly referred to as commerce. In addition to the two-way communications present in the second phase, this tier of service provides added security and reliability as the exchange of goods and services is conducted over the Internet. Some concepts IBM provides of Web-based commerce are followed by possible applications within the NPS Housing Welcome Center:

- *Personalized Web sites that foster one-on-one relationships with customers.*

These sites can build personalized pages on the fly or can "push" specific content, all based on what customer wants to see. For instance, if a segment of La Mesa is undergoing renovation, any family assigned a house in that area can automatically be updated on any delays. Automated waiting list updates can be sent to a requesting user's e-mail box or be the first screen the student sees when checking out Housing's Web site.

- *Commerce Web sites conduct business 24 hours a day. Customer self-service sites can offer online problem resolution, service, support, product information.*

These sites not only improve customer relations but can cut the cost of customer service. These advanced Web sites can conduct a full range of typical customer services, such as accepting a family's personal data (through filling out secure forms via the Web), injecting the information directly into Housing's database, and then adding their name to the waiting list.

While dividing web technology into the categories of content management, collaboration and commerce provides a useful context within which to discuss how they would fit into the NPS Housing Welcome Center, the best application might be to methodically draw upon each category's main capabilities as the entire Web site is developed.

An immediate gain can be realized through the simple publishing of rules, floor plans and basic information on the local housing market. Electronic mail would further stem the informational phone calls and allow counselors some time in addressing customers' needs, regardless of business hours. A fully automated Web site would transact information without counselor intervention, allowing for the smooth processing of incoming families while counselors handled peculiar situations that might not otherwise fit perfectly into their database.

VI. CONCLUSION

A. SUMMARY

Customer and employee surveys indicate that the Housing Welcome Center is stymied by an information bottleneck at the junction of its counselors and customers. Archival research indicates a need for an automated housing-control system. While incoming classes decry housing for its poor communication and lack of information, housing counselors toil to greet the next customer and answer the next phone call. This dichotomy illustrates the primary issue: the housing office needs to communicate information more effectively. This can be achieved in several ways, but the answer will need to focus on one concept: opening the bottleneck of communication to let information flow freely.

The current system forces information to flow through a central bottleneck: the counselor. Widening this constriction will provide the customer with more timely information and free the counselors to handle specific problems. Reviewing common information, researching housing policies, and even filling out automated forms that feed directly into housings' management information system can all be performed by the customer without the assistance of the counselor. This leaves the counselors to dedicate their work days to fielding fewer but more urgent phone calls and spending time solving problems.

The bottleneck of poor communications between the Housing Welcome Center counselors and new residents can be widened so as to facilitate both information transactions and problem solving. Customers can get their questions answered quickly and accurately while freeing counselors to tackle specific problems with incoming families.

In this era of budgetary cutbacks, the WWW remains the one mechanism that can boost productivity while reallocating scarce resources. Offering corporate knowledge in a continually open marketplace allows convenient access by customers and employees alike. By shifting the 95% daily time spent transacting information to training and problem solving, customers will find it easier to contact an employee and counselors can devote more effort to servicing customers. The day may come when happier families will *voluntarily* participate in a convenient housing process. As families opt to live on base again, the Navy can reinvest its cost savings into computer upgrades, more training and acting on the good ideas of its customers.

B. RECOMMENDATIONS

The NPS Housing Welcome Center can overcome its information bottleneck by exploiting the technological advances of the World Wide Web and becoming a hub of information resources. The thrust of the web site should center around content publishing and communications. The low technology requirements and gradual learning curve keep hardware and employee training costs to a minimum. I recommend that the office:

- Design its web site around NPS Housing rules and regulations. This would be the easiest task since they are used every day by customers and counselors and are already written; they only need to be transferred onto a web page.
- Ensure both customers and counselors participate in determining what is posted on the web page. These two groups will initially be the biggest benefactors of a housing web site; their participation and ideas are crucial in determining its content. Customers' should focus on their frequently asked questions; counselors can provide their tip-sheets of hotel phone numbers, local kennels, etc.

- Establish counselor e-mail accounts. This will lighten the telephone load on counselors and will help in managing customers' accounts.
- Expand the web site to become a hub of information resources. By allowing the customer to directly link with an information source (e.g., Monterey real estate agents, hotels, etc.), they get better results and, in the process, bypass the counselor.

After the first two stages of the web site are functioning, the next stage focuses on the transmission of vital data and making the web site easier to manage. New technologies would push specific information to customers while more powerful software would reduce down time and troubleshoot its own errors.

C. FOLLOW-ON RESEARCH

There is plenty of opportunity for follow-on research that could test the effectiveness of the NPS Housing Welcome Center web site (one is being constructed as of this writing). The essential ingredient will be measuring output, possibly through the web site itself. One example would be to count the number of times different portions of the web site are visited. Another example would allow customers to critique the web site and offer their recommendations. In either case, this could help management identify where more information or training is needed with minimal impact on the counselors. Some of the output has been baselined in this thesis and could be measured after web site implementation.

1. Customers

One example is to compare post-implementation customer surveys with pre-implementation customer surveys. There are two caveats; 1) that there is no control group, and this could confound any conclusions, and 2) that there will not be any

longitudinal panel study since the post-group will be a new incoming class and therefore a different sample. Still, some indication of trends would be helpful.

The following research design notation would apply for pre- and post-implementation customer surveys (Campbell and Stanley, 1963):

$$O_1 \quad x \quad O_2 \qquad\qquad \Delta_{xcs} = O_2 - O_1$$

where

O_1 = observation one for pre-implementation data,

x = web site implementation,

O_2 = observation two for post-implementation data.

The Δ_{xcs} is therefore equal to the difference in pre- and post-implementation observations.

2. Employees

The same could be applied to a post-implementation survey of employees. The comparison of post-implementation employee survey data to pre-implementation employee survey data would allow for the analysis of trends. The same two caveats, the lack of a control group and the lack of a longitudinal panel study, would still apply. Still, some indication of trends would be helpful.

The following research design notation would apply for pre- and post-implementation employee surveys (Campbell and Stanley, 1963):

$$O_1 \quad x \quad O_2 \qquad\qquad \Delta_{xe} = O_2 - O_1$$

where

O_1 = observation one for pre-implementation data,

x = web site implementation,

O_2 = observation two for post-implementation data.

The Δ_{xe} is therefore equal to the difference in pre- and post-implementation observations.

3. Archival

Post-implementation archival data could be compared to pre-implementation archival data presented in this thesis. Although a housing web site would not necessarily be expected to change monthly housing wait times, it could lead to greater customer satisfaction and a decrease in workload on the housing staff. Post-implementation counselor focus groups could also qualify a shift in concerns, complaints and administrative processes.

The following research design notation would apply for pre- and post-implementation archival research (Campbell and Stanley, 1963):

$$O_1 \quad x \quad O_2 \qquad\qquad \Delta_{xar} = O_2 - O_1$$

where

O_1 = observation one for pre-implementation data,

x = web site implementation,

O_2 = observation two for post-implementation data.

The Δ_{xar} is therefore equal to the difference in pre- and post-implementation observations.

APPENDIX A: THE NPS HOUSING WELCOME CENTER ORGANIZATIONAL CHART

APPENDIX B: HOUSING CUSTOMER SURVEY

Confidential **Summer 1997 Incoming Student Housing Survey** Serial #: 157

This survey is for a management project and thesis. Its goal is to improve the NPS Housing Office. The first step is to ask you, the customer, about your housing experience. Your response will be used to: 1) gauge customer satisfaction; 2) identify services the customer expects of a great Housing Office; 3) identify ways to measure the quality of those services; 4) categorize areas where the Housing Office exceeds and falls short of customer expectations; and 5) innovate solutions that maximize customer satisfaction and Housing Office effectiveness. Your complete and candid assessment is vital to this project and is highly appreciated.

First Name	Last Name	Phone #	SGC Mailbox #

Previous Duty Station	Rank (O-1, O-2, etc.)	Military Branch (if international, include country)

1) How would you rate your experience with the NPS Housing Office?

Great Terrible
○1 ○2 ○3 ○4 ○5

2) Did the Housing Office exceed or fall short of your expectations?

Exceeded Fell Short
○1 ○2 ○3 ○4 ○5

3) After arriving in Monterey, how many days were you in temporary housing (hotels, BOQ, friend's home) before you were given keys to your house?

_____ days

4) How many times did you communicate with Housing? (including faxes, initial and return phone calls, letters, etc.)

You to Housing _____ Housing to You _____

5) Did you access the Internet or an online service (like AOL):

Before NPS	Here at NPS
○ Yes	○ Yes
○ No	○ No

6) On average, how many times did it take to resolve a simple issue with Housing?

○ one time
○ 2-4 times
○ 5 or more times
○ never got resolved

7) How would you rate the quality of information you received before arriving at NPS?

Adequate Inadequate
○1 ○2 ○3 ○4 ○5

8) In communicating with an absent Housing worker, would you prefer:

☐ voice messages
☐ faxes
☐ e-mail

9) When searching for information, do you prefer:

☐ leaving a message for someone to call back
☐ finding it in a telephone voice mail system
☐ having the information faxed back to you
☐ looking it up on your computer (i.e. AOL)

10) List your children's birthdays and sexes below. (i.e. 31 May 90 - M)

11) How many pets do you have?

_____ Dogs _____ Cats _____ Other

12) Rank your priorities when choosing a home: (1 being the highest, 12 the lowest; use each number only once)

_____ # of bathrooms	_____ proximity to NPS	_____ saving money by living on base
_____ # of bedrooms	_____ car port / garage	_____ proximity to downtown
_____ storage space	_____ school quality	_____ recreational areas
_____ security / safety	_____ pets allowed	_____ other (please specify)

13) What are your expectations of a great Housing Office? (Don't censor yourself - be creative - be demanding!)

14) When did you arrive at the Naval Postgraduate School? _____ (i.e. May 90)

15) Where do you live? ○ In Mess ○ Fort Ord ○ Out in Town ○ NPS ○ POM Annex

16) Would you be willing to participate in a focus group to brainstorm new ideas for the NPS Housing Office? ○ Yes ○ No

17) Would you like to know the results of this survey? ○ Yes ○ No

Student Family Welcome Meeting ~ 1400 ~ 4 Jun 97

7 Jul

(over)

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18) List up to 5 **positive** experiences or issues you had with the Housing Office in which they *exceeded* your expectations. Start with the best case.

The Experience or Issue	What you expected of Housing	What Housing actually did that exceeded your expectations
1)		
2)		
3)		
4)		
5)		

19) List up to 5 **negative** experiences or issues you had with the Housing Office in which they *fell short* of your expectations. Start with the worst case.

The Experience or Issue	What you expected of Housing	What Housing actually did that fell short of your expectations
1)		
2)		
3)		
4)		
5)		

20) If you were in charge of the Housing Office, what would you change or incorporate to realize your expectations from question 13) on the first page?

Please turn this in at the back of the auditorium before you leave along with the "Academic Information / Preparation Prior to Arrival at NE" survey. Thank you for participating and Welcome to Monterey!

LT Warren Yu, Financial Management Curriculum

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